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Docket No.: 500.43088X00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:

Eiju KATSURAGI et al.

Serial No. 10/649,733

Filed: August 28, 2003

For: DISK ARRAY UNIT AND ITS METHOD FOR WRITING DATA

SUPPLEMENTAL REQUEST FOR RECONSIDERATION

June 21, 2005

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Supplemental to the Request for Reconsideration filed on May 26, 2005, in view of the meeting between Mr. Brundidge and Mr. Laufer held on June 9, 2005 clarifying issues related to the granting of Petitions to Make Special, Applicants submit the following additional remarks.

It is submitted that the cited references, whether considered alone or in combination, fail to disclose or suggest the invention as claimed. In particular, the cited references, at a minimum, fail to disclose or suggest in combination with the other limitations recited in the claims:

a first feature of the present invention as recited in independent claim 1 including writing in each sector of a series of sectors of the recording medium in which data is to be written caused by a single data write request location

information which is information indicating a location of the sector in the series of sectors and common information which varies every time data writing to the series of sectors occurs and is information set relating to the series of sectors;

a second feature of the present invention as recited in independent claim 4 including writing in each sector of a series of sectors of a recording medium in which data is to be written caused by a single data write request location information which is information indicating a location of the sector in the series of sectors and common information which varies every time data writing to the series of sectors occurs and is information set relating to the series of sectors;

a third feature of the present invention as recited in independent claim 6 wherein a communication control unit writes in data to be written in each sector of a series of sectors of the recording medium in which data is to be written caused by the data write request location information which is information indicating a location of the sector in the series of sectors and common information which varies every time data writing to the series of sectors occurs and is information set relating to the series of sectors;

a fourth feature of the present invention as recited in independent claim 7 wherein an I/O control unit adds to data to be written in each sector of a series of sectors of the recording medium in which data is to be written caused by the data write request location information which is information indicating a location of the sector in the series of sectors and common information which varies every time

data writing to the series of sectors occurs and is information set relating to the series of sectors;

a fifth feature of the present invention as recited in independent claim 8 wherein a communication control unit writes in data to be written in each sector of a series of sectors of the recording medium in which data is to be written caused by the data write request location information which is information indicating a location of the sector in the series of sectors and common information which varies every time data writing to the series of sectors occurs and is information set relating to the series of sectors;

a sixth feature of the present invention as recited in independent claim 9 wherein a communication control unit writes in data to be written in each sector of a series of sectors of the recording medium in which data is to be written caused by the data write request location information which is information indicating a location of the sector in the series of sectors and common information which varies every time data writing to the series of sectors occurs and is information set relating to the series of sectors;

a seventh feature of the present invention as recited in independent claim 10 wherein means for writing in data to be written in each sector of a series of sectors of the recording medium in which data is to be written caused by a data write request location information which is information indicating a location of the sector in the series of sectors and common information which varies every time data writing to the series of sectors occurs and is information set relating to

the series of sectors when it receives the data write request from the external device;

an eighth feature of the present invention as recited in independent claim 11 wherein when writing data to the disk drive according to the read modify write method, the disk array unit writes in each sector of a series of sectors of the recording medium in which data is to be written caused by a single data write request location information which is information indicating a location of the sector in the series of sectors and common information which varies every time data writing to the series of sectors occurs and is information set relating to the series of sectors;

a ninth feature of the present invention as recited in independent claim 12 wherein when writing data to the disk drive according to the read modify write method, the disk array unit writes in each sector of a series of sectors of the recording medium in which data is to be written caused by a single data write request location information which is information indicating a location of the sector in the series of sectors and common information which varies every time data writing to the series of sectors occurs and is information set relating to the series of sectors;

a tenth feature of the present invention as recited in independent claim 13 wherein validation means which reads out the location information and the common information written in each continuous sector of the recording medium and validates data based on the read out location information and common information; and

an eleventh feature of the present invention as recited in independent claim 14 wherein validation means which reads out the location information and the common information written in each continuous sector of the recording medium and validates data based on the read out location information and common information.

To the extent applicable to the present Petition, Applicants submit that although the distinguishing feature(s) may represent a substantial portion of the claimed invention, the claimed invention including said feature(s) and their inter-operation provides a novel storage system and system and method related to or implemented in or by said storage system not taught or suggested by any of the references of record.

The references considered most closely related to the claimed invention are briefly discussed below:

U.S. Patent No. 5,557,767 (Sukegawa) discloses in accordance with a write request from a host system in a direction of incrementing an address, a controller generates the same writing code and writes the writing code with ID information of each sector in a hard disk drive unit. Even when a series of related data are written on a plurality of sectors having non-sequential addresses, the same writing code is written in the ID information of each sector as far as the values of the sector addresses to be written change in the direction of incrementing the address. When the sector data is read ahead and registered in a read ahead cache in accordance with a data read request from the host system, a series of related sector data are registered in the read ahead cache on

the basis of the writing code. However, Sukegawa does not disclose, at a minimum, writing in each sector of a series of sectors location information which is information indicating a location of the sector in the series of sectors and common information which varies every time data writing to the series of sectors occurs and is information set relating to the series of sectors, and/or validation means which reads out the location information and the common information written in each continuous sector of the recording medium and validates data based on the read out location information and common information. More particularly, Sukegawa does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 4, the above described third feature of the present invention as recited in independent claim 6, the above described fourth feature of the present invention as recited in independent claim 7, the above described fifth feature of the present invention as recited in independent claim 8, the above described sixth feature of the present invention as recited in independent claim 9, the above described seventh feature of the present invention as recited in independent claim 10, the above described eighth feature of the present invention as recited in independent claim 11, the above described ninth feature of the present invention as recited in independent claim 12, the above described tenth feature of the present invention as recited in independent claim 13 and the above described eleventh feature of the present invention as recited in independent claim 14, in combination with the other limitations recited in each of the independent claims.

U.S. Patent No. 5,719,885 (Ofer et al.) discloses a method and apparatus for improving the data storage reliability of a host computer writing to a disk storage device receives a plurality of blocks of data from the host computer and writes the blocks of data, according to a selected format, in a high speed cache memory. The data blocks in cache memory are then written to the disk drive, the blocks having a defined size. A plurality of the blocks form a sector on the disk drive and a plurality of the sectors form a track on the disk drive. Writing to the disk includes, transparently to the host, the calculation and attachment to each block of an error correcting code value. When data is written to the data cache, there is generated and associated with each of a group of the blocks of data, from the host computer, a second error code. The second error code is stored at a physical location in the cache memory, and when written to disk, is further written at a location which is not in the same sector as any of the blocks with which the second codes are associated. In this way, the host to cache level communications acquires a higher degree of reliability than previously available for full block transfer under, for example, the UNIX operating system. However, Ofer et al. does not disclose, at a minimum, writing in each sector of a series of sectors of the recording medium in which data is to be written caused by a single data write request location information which is information indicating a location of the sector in the series of sectors and common information which varies every time data writing to the series of sectors occurs and is information set relating to the series of sectors, and/or validation means which reads out the location information and the common information written in each continuous sector of the

recording medium and validates data based on the read out location information and common information. More particularly, Ofer et al. does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 4, the above described third feature of the present invention as recited in independent claim 6, the above described fourth feature of the present invention as recited in independent claim 7, the above described fifth feature of the present invention as recited in independent claim 8, the above described sixth feature of the present invention as recited in independent claim 9, the above described seventh feature of the present invention as recited in independent claim 10, the above described eighth feature of the present invention as recited in independent claim 11, the above described ninth feature of the present invention as recited in independent claim 12, the above described tenth feature of the present invention as recited in independent claim 13 and the above described eleventh feature of the present invention as recited in independent claim 14, in combination with the other limitations recited in each of the independent claims.

U.S. Patent No. 6,629,199 (Vishlitzky et al.) discloses a digital data storage system in the form of a mass storage subsystem in which information is stored on one or more disk storage units, with a storage element constituting a track on a disk storage device and each track storing a plurality of records. Each track in each disk storage device of the digital data storage system is associated with a descriptor. When the control device retrieves the contents of a record, it

can process the contents to generate a check value and compare the generated check value with the check value for the record as stored in the descriptor associated with the track. If they compare appropriately, the control device can determine that the record that was retrieved was, in fact, the record that was to be retrieved. On the other hand, if they do not compare appropriately, the control device can determine that the record that was retrieved was not the proper record. If the contents of the record are updated, the control device can update the check value in the descriptor to reflect the update of the record. However, Vishlitzky et al. does not disclose, at a minimum, writing in each sector of a series of sectors of the recording medium in which data is to be written caused by a single data write request location information which is information indicating a location of the sector in the series of sectors and common information which varies every time data writing to the series of sectors occurs and is information set relating to the series of sectors, and/or validation means which reads out the location information and the common information written in each continuous sector of the recording medium and validates data based on the read out location information and common information. More particularly, Vishlitzky et al. does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 4, the above described third feature of the present invention as recited in independent claim 6, the above described fourth feature of the present invention as recited in independent claim 7, the above described fifth feature of the present invention as recited in

independent claim 8, the above described sixth feature of the present invention as recited in independent claim 9, the above described seventh feature of the present invention as recited in independent claim 10, the above described eighth feature of the present invention as recited in independent claim 11, the above described ninth feature of the present invention as recited in independent claim 12, the above described tenth feature of the present invention as recited in independent claim 13 and the above described eleventh feature of the present invention as recited in independent claim 14, in combination with the other limitations recited in each of the independent claims.

Japanese Patent No. 8-212711 (Kojima) discloses to facilitate the data control by dividing data into the data packets having a constant length, and adding the intrinsic identification codes corresponding to the divided orders to the specified position of each divided data packet. Original information data are divided into (n) pieces of information data, which are the data packets having a constant length. Intrinsic row identification codes 0 to (n-1) corresponding to the divided orders are added to the specified positions, e.g. the head, of respective information data. The row identification code is constituted in the ascending order or descending order of the row identification codes, e.g. binary codes. Thus, the first error correcting code p_0 of each data packet is formed, and the first code series formed by adding each data packet is formed. Then, the second error correcting code p_i in each series after interleaving is formed and added to each series, and the second code series is formed. The recording sector packets such as these continuously connect the rows and are recorded in a disk

or transmitted. However, Kojima does not disclose, at a minimum, writing in each sector of a series of sectors of the recording medium in which data is to be written caused by a single data write request location information which is information indicating a location of the sector in the series of sectors and common information which varies every time data writing to the series of sectors occurs and is information set relating to the series of sectors, and/or validation means which reads out the location information and the common information written in each continuous sector of the recording medium and validates data based on the read out location information and common information. More particularly, Kojima et al. does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 4, the above described third feature of the present invention as recited in independent claim 6, the above described fourth feature of the present invention as recited in independent claim 7, the above described fifth feature of the present invention as recited in independent claim 8, the above described sixth feature of the present invention as recited in independent claim 9, the above described seventh feature of the present invention as recited in independent claim 10, the above described eighth feature of the present invention as recited in independent claim 11, the above described ninth feature of the present invention as recited in independent claim 12, the above described tenth feature of the present invention as recited in independent claim 13 and the above described eleventh feature of

the present invention as recited in independent claim 14, in combination with the other limitations recited in each of the independent claims.

Therefore, since the cited references fail to disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 4, the above described third feature of the present invention as recited in independent claim 6, the above described fourth feature of the present invention as recited in independent claim 7, the above described fifth feature of the present invention as recited in independent claim 8, the above described sixth feature of the present invention as recited in independent claim 9, the above described seventh feature of the present invention as recited in independent claim 10, the above described eighth feature of the present invention as recited in independent claim 11, the above described ninth feature of the present invention as recited in independent claim 12, the above described tenth feature of the present invention as recited in independent claim 13 and the above described eleventh feature of the present invention as recited in independent claim 14, in combination with the other limitations recited in each of the independent claims, it is submitted that all of the claims are patentable over the cited references whether said references are taken individually or in combination with each other.

In view of the foregoing, Applicant requests that this Petition to Make Special be granted and that the application undergo the accelerated examination procedure set forth in MPEP 708.02 VIII.

Respectfully submitted,

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